

THE RESOURCES AGENCY OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
MARINE RESOURCES OPERATIONS

REPORT FOR THE MONTH OF MARCH 1969

The Inter-American Tropical Tuna Commission held its annual meeting in San Diego 18-22 March. The Commission recommended an annual quota of 120,000 tons for 1969, 1970 and 1971, with a provision that fishing should be curtailed if the seiner catch rate falls below 3 tons per day. For 1969 only, vessels of 300 tons carrying capacity or less can continue fishing after the closure up to 4000 tons per country.

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The first U.S.-Mexico annual meeting called for under the 1967 fishery agreement was held in La Jolla on 24 March. No problems were raised with respect to observance of terms of the agreement. The two countries took first steps toward implementing Article 14, which provides for cooperation in formulating programs of scientific research and conservation of stocks of common concern. A coordinating group for the Pacific coast was set up with Roedel the U.S. representative. The function of the group is to exchange data and ideas for joint research leading to a mid-summer meeting. Sardines and Pacific mackerel are to receive priority attention.

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We were extremely pleased to learn Linda Murakami, our research observer from Eureka High School, has been selected to present a paper on her work with Dover sole age validation technique at Stanford University and Westpoint, New York. Linda is one of 50 high school students participating in the March 28 and 29, Stanford conclave and one of six students chosen to represent California at the nationwide symposium in New York April 30 - May 4.

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Symposium on New Product Development and Marketing in West Coast Fisheries

A "Symposium on New Product Development and Marketing in West Coast Fisheries" sponsored by the California Department of Fish and Game, Humboldt State College, Humboldt Bay Fisheries Association and College of the Redwoods was held at the Eureka Inn, Eureka, California, March 7 and 8. The symposium was made possible by a matching grant to Humboldt State College administered by the State Business and Transportation Agency for the State Technical Services Office of the U. S. Department of Commerce.

The Friday session was devoted to new product development. Four papers were presented as part of the symposium. These were: "Kamaboko" (fish sausage) by Dr. Minoru Okada, Chief, Protein Chemistry Section of the Tokai Regional Fisheries Laboratory in Japan; "Fisheries By Products", by Eldon Anderson, President, Marine Technology, Inc., a division of Litton Industries which specializes in computerized systems analysis of fisheries operations and the research and development of high-protein foods from the sea; and "Sea-Farming" by W. P. Breeze, Assistant Professor of Fisheries, Oregon State University. W. W. Budge also presented a resume of his Pacific Mariculture, Inc., operation at Pescadero, California.

Following an evening seafood banquet, Robert Erkins, President of the Snake River Trout Company in Buhl, Idaho and chairman of the Board of the National Fisheries Institute, presented his thoughts on the symposium theme. His paper titled "Problem Areas in Seafood Product Development and Marketing", generally summarized the thoughts of all the symposium speakers. He emphasized that resource utilization by the fishing industry must be oriented to the items that directly affect the usage of the fish product. These include quality control and product innovations to meet consumer needs.

Saturday's session was concerned with marketing. Four speakers were featured. The first speaker, Doris Robinson, Home Economist with the Bureau of Commercial Fisheries, Terminal Island, spoke on "Consumer Education". The next two speakers were from the Bureau of Commercial Fisheries, Seattle, Washington. John Dassow, Supervisory Research Chemist, spoke of "Quality Control" and Roy Stevens, Coordinator of Marketing, presented his thoughts on "Expanding Markets for West Coast Fish and Shellfish". The final speaker of the symposium was Robert T. Rattigan, Executive Vice President for Corporate Design Consultants, Inc., Boston, Massachusetts. Mr. Rattigan's paper, "New Concepts in Fish Product Marketing", closed the session on a refreshing note of renewed interest and enthusiasm--J. Gary Smith.

1. BOTTOMFISH

A. Fishery

Flatfish: Poor weather conditions continued to restrict fishing effort along the central and northern coast. Fishing activities were limited to partial trips mostly in the nearshore areas. Light catches of English, petrale, and rex sole comprised the majority of landings in the Eureka area; Dover sole landings were sparse. English and petrale landings were moderate from San Francisco to Morro Bay with some improvement during the last half of the month. Santa Barbara reported good catches of English sole.

Roundfish: Catches were moderate to good with improvement during the last half of the month, especially in the southern area.

B. Research

Flatfish: Market sampling was commensurate with landings. We were extremely pleased to learn Linda Murakami, our research observer from Eureka High School, has been selected to present a paper on her work with Dover sole age validation technique at Stanford University and Westpoint, New York. Linda is one of 50 high school students participating in the March 28 and 29, Stanford conclave and one of six students chosen to represent California at the nationwide symposium in New York April 30 - May 4.

The 1968 trawler log and receipt inventory was completed and transmitted to Terminal Island with February 1969 logs and receipts.

Six tagged fish were recovered, all English sole. One was released in Washington and recovered off Eureka. The rest were recovered near the release areas.

2. SHELLFISH

A. Fishery

Abalone: Heavy seas and dirty water made the opening week of the 1969 season a poor one for Morro Bay abalone fishermen, who took only about thirty dozen abalones.

Crab: The San Francisco fishery is practically non-existent. Only a few boats are fishing and these are landing only once or twice a week. Preliminary landings through February total 714,000 pounds. Total landings for the season are expected to be less than 750,000 pounds.

Weather conditions improved and allowed crab fishermen to work their traps almost every day. However, most fishermen are allowing the gear to soak several days because of the very low catch per trap for overnight sets.

Total estimated landings through March 15 for Eureka and Crescent City amounted to 9.4 million pounds. Fort Bragg fishermen have landed an estimated 800,000 pounds.

Oysters: Pacific oyster seed aboard the S.S. Kodo Maru arrived in Eureka and San Francisco on March 20 and 22, respectively. A total of 8,510 standard cases of seed were unloaded at Eureka and 2,609 standard cases at San Francisco. This is the largest shipment of seed from Japan since 1959 when 12,460 standard cases of seed were imported.

Coast Oyster Company resumed harvesting about mid-month. A mortality due to unknown causes resulted in a loss of 3 to 5 percent of the oysters in their Bird Island bed. Eureka Oyster farms has set up two experimental racks on private land in South Humboldt Bay, the first oyster culture that has been attempted in South Bay for about 10 years. They intend to set up enough racks to hold about 1,000 cases of seed purchased in Japan.

Clams: Low tides and good weather have produced large numbers of sport clam diggers in the Bay. Several diggers reported finding large numbers of dead gapers, *Tresus capax*, on the north end of south split and near Buhne Point.

Shrimp: California season closed. The Oregon shrimp season opened on March 1. Good fishing was reported off Coos Bay. Counts per pound reportedly were averaging 120.

B. Research

Abalone: The pink, green and black abalones collected at Guadalupe Island remained in the hatchery at Cayucos pending favorable weather. Mortality has been minimal, the remaining abalones are feeding and appear to be in good condition.

Preparations were begun for the forthcoming Diablo Canyon study.

The project leader departed for Baja California at mid-month to participate in a cruise with Moss Landing Marine Laboratory personnel, to investigate the abalone populations along the Baja California coast.

Crab: A trawling cruise to determine incoming year class abundance was completed March 7. No data was obtained because of adverse weather and sea conditions.

At Eureka we continued our catch-per-unit of effort studies with 65 fishermen interviews. One day sets produced an average of 3.1 pounds per trap for Eureka fishermen and 4.5 pounds per trap for Crescent City fishermen.

Two condition samples were taken at Eureka and three at Crescent City. The average weight was 2.0 and 2.1 for Eureka and Crescent City crabs, respectively. None of the Eureka crabs examined had soft shells, but 4.3 percent of the Crescent City samples were soft.

The two daylight bay trawls yielded 330 crabs, the two at night, 727.

Considerable time was spent compiling data collected from the local Weather Bureau office. It is hoped that the data will show when the Davidson current begins and ends off northern California. This information will be compared with crab and shrimp year class success to see if there is any relationship.

Shrimp: Analysis of the shrimp sea survey data collected since 1965 continued. All of the tables have been completed and the rough figures should be compiled by the first of March.

Plans were made to conduct spot prawn fishing aboard the N. B. Scofield in southern California from March 26 to April 13. Submarine canyon areas near some of the channel islands and mainland will be explored.

Oysters and Clams: Clam diggers were counted and interviewed for catch on Clam Bar in Tomales Bay. On Saturday, March 15, 415 diggers were counted and 289 were interviewed. This was the largest turnout this season. Diggers averaged about seven clams per digger.

The monthly sample from Seal Bar on Tomales Bay was obtained. All clams on the permanent plots were counted for recruitment and mortality studies. Measurements and weights were obtained for growth studies.

Clam studies under contract with California Polytechnic at Morro Bay, Moss Landing Marine Laboratories at Elkhorn Slough and San Francisco State at Bolinas Lagoon are proceeding. Clam species, abundance, size and fishermen effort data are being obtained.

Two days were spent making random counts of clam diggers in South Bay to estimate total effort. A maximum of 35 sport diggers was counted on the one weekday surveyed, and 111 diggers on the one weekend day surveyed.

Dick Burge investigated the clam mortality on south spit by examining clams from 3 meter squares. He found 78 dead gapers, *Tresus capax*, and 18 live gapers. In addition, he noted 17 dead and 7 live clams representing several other species. Most of the dead gapers were juveniles.

On March 10, 1,000 scallops from Japan were placed in the water at Marshall, Sacramento Landing and Lawson's Landing in Tomales Bay. Efforts will be made to relocate the scallops in the more saline portions of Tomales Bay and Drakes Estero.

3. SHELLFISH & BOTTOMFISH DATA ANALYSIS (Bartlett Project M68D)

Information Storage and Retrieval System

The rockfish, hake, lingcod, and sablefish data were transcribed from 10 years' box sampling data. This data is being keypunched and will be established in an INFOL system in the future.

The market sampling data for shrimp from 1960-67 were transcribed and are being keypunched.

Log data provided by crab fishermen in the Eureka area are being keypunched. It will be used for another crab population estimate for the Eureka area.

Length and age data of 2 year classes of ocean shrimp were fitted to a von Bertalanffy growth curve using BCGI, a Fortran program written by the Biometrical Analysis unit, Terminal Island.

Length frequencies of ocean shrimp by sex were produced from market sampling data for each week of the 1968 season by Dan Gotshall, Eureka. The data will be used to examine the present market sampling plans for possible revision.

A length-weight curve was computed from a sample of crabs from crab cruise 68-N-12. Length-weight curves by month were also produced for shrimp landed at Bodega Bay from May-September.

A Fortran program to compute catch/trap, catch/delivery and catch/delivery/trap was debugged.

Regressions by area of total weekly landings versus cumulative catch, mean pounds/delivery/week versus cumulative catch, and mean pounds landed per boat/week versus cumulative catch provided some initial estimates of population sizes and catchabilities of market crab.

A manuscript explaining the features of INFOL is being prepared for publication.

On March 7, project personnel attended a seminar, explaining the features of MAC/RAN, a system for analysis of random data. This system will be operational on the new Control Data 6600 computer.

The American Fisheries Society chapter meeting was attended on March 21. Jim Cheap, OWR, demonstrated a remote access terminal at Menlo Park on March 12. The terminal connects into the OWR computer in Sacramento by telephone. Input and output are transmitted via a teletype device.

The highlight of the month was an open house and demonstration of Data Control's new 6600 Super Computer, followed by a reception at a nearby country club. The reception provided an opportunity for informal discussion with specialists in computer applications and data processing.

4. PESTICIDE MONITORING (B.C.F. Contract)

The Editorial Review Board of the Pesticides Monitoring Journal has accepted the manuscript, "Chlorinated Pesticides in California Bays and Estuaries", after minor revision. The paper should appear in the June issue of the Pesticides Monitoring Journal.

Seasonal Aid training has continued at an accelerated rate during March. Unexpected resignation of a Seasonal Aid hired in January required the additional effort.

Laboratory agreement of duplicate samples by the Bureau of Commercial Fisheries and the California Department of Fish and Game continue to be quite acceptable.

John Modin has been accepted for enrollment in the U. S. Public Health Service course, "The principles and Practice of the Analytical Chemistry of Pesticides", scheduled April 21, 1969 near Miami.

5. SHELLFISH LABORATORY OPERATIONS (Bartlett Project M64R4)

A proposed lease was submitted to Stanford for approval at the Board of Trustees' meeting in March. Unfortunately the item was not placed on the agenda and layed over until the April meeting. Stanford University is in the process of obtaining firm contract figures on the cost of the facilities requested to be presented to the Board of Trustees April 14-15.

Delays in administrative processes both in the Department of Fish and Game and Stanford University have placed the laboratory in a precarious position. Inability to purchase equipment or obtain temporary space will make it necessary to obligate funds at the last minute when the lease is finally approved. Adequate funding is available to install and service equipment, assemble the sea water system and purchase equipment; however it will be impossible to accomplish all of these things in this fiscal year if many more delays occur. Most of the sea water system and equipment installation will have to be done by laboratory personnel which will occupy all of their time for several months.

In anticipation of approval of the lease most of the time has been spent in ironing out final details in laboratory plans. A detailed plan has been drawn including all equipment, valves, piping, etc. This was necessary in order to place an order for pipe, fittings, and valves.

Research

Seven new stations were placed at the ecological study plot at Pacific Grove. Non-cooperative skin divers removed all buoys from the stations making it necessary to use much diving time locating the padeyes and placing new buoys.

A day was spent at Pacific Mariculture reviewing their sea water system and assisting in planting hybrid abalones.

6. OYSTER DISEASE AND MORTALITY STUDY (B.C.F. Contract)

Routine sampling of experimental populations of oysters was carried out in Drakes Estero, Tomales Bay and Humboldt Bay during March. Mortalities in all areas were negligible.

Repairs were accomplished on one of the experimental stations in Drakes Estero, it is anticipated that similar repairs will be necessary at the rest of the experimental sites.

The processing and examination of oyster tissue continues.

The project is on schedule.

7. SEA OTTER

Two sea otters were trapped in kelp beds off the Cambria Radar Station on February 5, 1969. The otters were taken by boat to Morro Bay and transported by carryall to Stanford Research Institute (SRI) in Fremont

where arrangements had been made to conduct studies on medical care, husbandry, physiology, marking techniques and behavior of sea otters.

The animals, both males, weighing 57 and 61 pounds were placed in a wooden enclosure with a 8 x 10 foot pool. Medical examinations were conducted by the attending veterinarian on both animals the following day to obtain baseline information on California sea otter physiology. One otter responded well, the second required a tranquilizer. The animals were fed at least twice daily. Their diet in captivity consisted of fillet of rockfish, whitebait, sablefish, herring, and squid. One animal seemed to adapt well to captivity. The other fed only intermittently, neglected its pelage and generally appeared to be in a depressed physical and mental state. It died 13 February 1969. An autopsy performed immediately indicated that the cause of death was gastroenteritis, interstitial emphysema, and pneumonitis. Both animals showed considerable weight loss during the first week of captivity. The surviving otter is now eating well, up to 15 lbs. of food in a day. Live red rock crabs and fresh gaper clams are taken avidly. Marking experiments are now underway using various tags on the animal in captivity. Preliminary tests indicate that bleaching may not be a practical method for marking sea otters.

An aerial census of the central California sea otter population was made on March 10, 1969. Censusing conditions were very good and 931 sea otters including 14 pups were counted between Seaside and Point Estero. This count compares closely with the high count of 983 sea otters made on January 31, 1969.

Two rafts each composed of about 55-60 individuals were seen in the vicinity of the Cambria Radar Station about 5 miles south of the Refuge. A total of 129 sea otters were observed south of Refuge boundaries.

Trapping and tagging operations are planned for the week of March 24-28.

On March 14, Mel Odemar participated in an aerial search for dead whales between Santa Cruz and the Gualala River. Three dead whales were sighted; one at Pacifica, one off Duxbury Pt., and one on Pt. Reyes Beach.

8. PELAGIC FISH

A. Fishery

Landings in tons	March		January 1 - March 28		10 yr. mean 1958-1967
	1969*	1968	1969*	1968	
Species					
Anchovy	650	217	2,279	1,389	4,155
Mackerel, jack	2,700	408	6,305	3,817	6,156
Mackerel, Pacific	100	47	221	183	1,898
Sardines	1	3	2	23	724
Squid	220	354	1,220	4,476	1,755
Total	3,671	1,029	10,027	9,888	14,688

*Estimated. Accumulated landings are revised monthly.

B. Anchovy

Fishery	Quota (tons)	Season landings through March 27 (tons)	March landings (tons)
Southern Permit Area			
I	5,000	1,256	0
II	5,000	3,105	125
III	5,000	3,095	205
IV	5,000	238	55
V	45,000	4,935	265
Southern Total	65,000	12,629	650
Northern Permit Area	10,000	2,354	0
Statewide Total	75,000	14,983	650

Commercial: Until the last week of the month, purse seiners concentrated on catching mackerel. Early in the last week reports of large concentrations of good sized anchovies close to port triggered a renewed effort for anchovies and the 6 boats that fished landed 650 tons. An estimated 300 tons more will be landed March 28.

Live Bait: A Long Beach landing operator acquired two live bait businesses during the month. One in San Diego (formerly Brock's) and one in Oceanside. The deal included four fishing boats.

Live bait fishing between San Diego and Newport Beach has steadily improved during the month.

Dealers in the Los Angeles-Long Beach area have been forced to fish outside the breakwater west of Point Fermin. All dealers north of Los Angeles are fishing in Santa Monica Bay.

Research: During the month seven anchovy samples were taken at Terminal Island, all during the last week of March.

Three tags were recovered at the Terminal Island reduction plants: two were local releases, one was from the September 11, 1968 tagging in San Francisco Bay. This latter tag recovery is the first record of a tag released in San Francisco Bay being recovered south of Monterey.

A cooperative tagging effort with biologists from the Laboratoria de Biologia Marina, Ensenada, Baja California was initiated. The first trial session saw 1,500 anchovies tagged and released off Ensenada, Baja California.

Since March 13, 1966, 370,754 tags have been released and 855 tags have been recovered.

C. Mackerel-Sardine

Fishery

Fleet: Good weather throughout the month lead to increased fishing effort and greater tonnage of fish landed. Twenty-seven purse seiners

and one lampara boat were active in the southern California wet-fish fishery and all landed mackerel at Terminal Island and/or Port Hueneme. In addition, 8 seiners landed anchovies for reduction, and 12 seiners landed bonito.

Jack Mackerel: For the first time in several months, Cortez bank was fished and contributed about 37% of the jack mackerel catch for March. Twenty-eight percent of the month's landings were from San Clemente Island, 25% from the inshore area (Santa Monica bank to the Horseshoe Kelp), and the balance from Santa Catalina Island, Santa Barbara Island, and inshore areas off San Diego County.

Young-of-the-year fish predominated in catches from the offshore islands and banks, while many of those taken from inshore areas were older.

Pacific Mackerel: Most Pacific mackerel landed in March were in mixed loads with jack mackerel. Two "pure" loads of Pacifics were taken at San Clemente Island. As was true of jack mackerel catches, inshore areas yielded larger fish, offshore areas smaller fish.

Sardines: Sardines were present in trace amounts in several mackerel loads from inshore areas and Catalina Island. All were large, old fish.

Squid: Squid landings were moderate at Terminal Island and Port Hueneme. Squid appear to be plentiful, but small.

Research: Twenty-six jack mackerel, four Pacific mackerel, and one sardine sample were taken during the month.

Considerable time was spent reviewing the status of Pacific mackerel stocks in preparation for the meeting with representatives of Mexico, which was held at La Jolla, March 24.

Effort was spent on assignment of ages to jack mackerel samples from the 1967-68 season.

Work continued on the study of fishing effort assignment in a multi-species fishery.

Several samples of mackerel stomachs were collected for the California Academy of Sciences.

D. Fisheries Resources Sea Survey (Bartlett M63R)

Sea Surveys: A survey cruise of central and southern California waters was cancelled due to a long delay in approval of a contract to overhaul the ALASKA's main engine.

The new trawl winch for the ALASKA was delivered early in the month and plans were formulated for installing it and a depth telemetry system.

All data from cruise 69A1 have been edited and all collected age data are complete.

New data coding forms were designed to incorporate sonar data and facilitate recording of other data.

Haaker and Mais spent two days assisting Environmental and Behavioral Project personnel in surveying an area near Ventura where Highway 101 will be moved seaward and resurveying transects at Anacapa Island affected by the Santa Barbara oil spill.

Data Analysis: The month was spent in developing sampling methods that will improve the reliability of anchovy age and size data obtained from midwater trawl tows.

9. TUNA

A. Albacore

Research

Life History: Age and growth--Work continued on the analysis of historical length-frequency data and on the age composition of the albacore migration.

Population Dynamics: A Program which computes catch-per-effort by boat length and by gear type is almost complete. It should enable us to determine the relative success of albacore boats by size category.

To ensure that new computer programs and our existing data tapes are compatible, we obtained data print-outs for the years 1961, 1962, and 1963. This information will be checked for possible conflict.

A listing of all Documented albacore fishing vessels was completed. Various physical characteristics of Documented vessels were measured in a standard manner which will allow us to compare activities of different vessels in the albacore fleet and to further check our logbook sampling plan.

Fishery

Sport and Commercial: No action.

B. Bluefin Tuna

Research

Population Dynamics: Logbooks of the 1968 purse seine fleet have been abstracted, and the hailed tonnages adjusted to agree with pink ticket reports. The log abstracts can now be processed by Biostatistics for the annual bluefin tuna report.

Fishery

Sport and Commercial: No action.

C. Pacific Bonito

Research

Life History: Age and Growth--A preliminary study of bonito otoliths indicated that otoliths may prove reliable as indicators of bonito age.

If so, they will be used to determine the age composition of the catch. Two bonito length-weight and otolith samples were obtained during the month.

Fishery

Sport: Catches generally were on the slow side.

Commercial: Landings for the month were about 250 tons, as the fleet began concentrating on other species.

D. Miscellaneous

Resources of Tunas and Related Species

The IATTC has recommended a yellowfin tuna quota of 120,000 tons for 1969, 1970 and 1971. Member nations will meet later to discuss adoption of the recommendations.

Administration

Personnel: Pete Morgenroth was appointed Junior Aquatic Biologist on March 24. Much of his time will be spent conducting research in the field of population identification.

Harvey Pearson was appointed, March 3, Seasonal Aid in the albacore project.

Richard Murphy, Seasonal Aid, terminated his employment this month.

Budget Preparation: Considerable time was spent in preparing the 1970-1971 program budget.

10. SPORTFISH

A. Partyboat

Research: Two tagged sand bass were recovered, and 75 were tagged and released in Newport Bay. Additional tagging was scheduled for mid-April. Statistical data relating to partyboat fishing in the Santa Barbara-Ventura area were prepared for the Western Oil and Gas Assoc.

Fishery: The 1969 partyboat catch of key species, accumulated through February, compares with 1968 as follows: (nearest 100)

<u>Through February</u>	<u>1969</u>	<u>1968</u>
Rockfish	174,000	370,700
Bonito	35,600	50,400
Barracuda	11,800	19,300
Kelp, sand bass	10,500	23,800
Salmon	7,600	6,400
Calif. halibut	2,600	6,200
Yellowtail	2,000	200
Sturgeon	631	266
Striped bass	153	399

The partyboat Pierpoint reported a catch of 13,829 sanddabs in 8 trips. In 32 hours of fishing, 189 anglers averaged 72 dabs per angler day, or 432 fish per boat hour.

B. Environmental and Behavioral Studies of Coastal Sport Fishes (DJ F22R)

Project diving biologists conducted a survey along the Avalon, Santa Catalina Island, sewage outfall at the request of Region 5. This survey's objectives were to determine the integrity of the pipe, observe the visible fate of the discharged wastes, and determine the general "health" of the biota adjacent to the outfall. We found the outfall was intact to its terminus in 125 feet of water. The effluent "ballooned" above the outfall, layered slightly about 20 feet off the bottom, and flowed shoreward with mixing of the effluent and the receiving waters taking place in depths less than 60 feet (about 200 feet offshore). Sewage (paper, flocculent material, etc.) was noticeable from this point shoreward, throughout the water column. Although this area supported a varied population of fishes, it was esthetically unpleasant to swim in. We recorded 15 species of fish, 16 different invertebrates, and 5 algae on the pipe or in its immediate vicinity. A more detailed survey could increase this species list appreciably. In general, the area's "Biotic health" appeared normal. An extensive area of hydrogen sulphide (H_2S) bearing sands, seaward (down-slope) from the pipe terminus, warrants further study.

We conducted another survey, off Seacliff, Ventura County, at the request of Region 5. This survey's objective was to define the marine resources in that area that may be endangered by proposed landfill and highway construction. Numerous sub-legal Pismo clams, *Tivela stultorum*, were present in the intertidal and nearshore subtidal areas. Twenty-five bent-nose clams, *Macoma nasuta* were collected subtidally in one 0.5 m² area, and a sizable bed of sunset clams, *Gari californica*, was observed several miles down coast from the area to be filled. Offshore we noted a modest kelp bed paralleling the beach in waters 14 to 30 feet deep.

These areas are all potentially endangered by the landfill and subsequent highway construction.

We suggest that compensation for their loss might include rescue and transplanting of the Pismo clams, construction of offshore fishing reefs to replace or enhance the nearby kelp areas, and public access, adjacent to the roadway, to enable sport fishermen to continue to avail themselves of this historic surf fishing area. In any case, construction methods must minimize or prevent sediment transport away from the landfill and onto the down coast clam beds or into the offshore kelp areas.

Work was initiated on our contract survey, offshore from San Elijo and San Dieguito Lagoons, for the San Diego Regional Water Quality Control Board.

Much of the month was spent in various meetings and identifying and enumerating specimens collected from our many on-going studies.

Upper Newport Bay-Sunset Bay Contract Studies

Two days were spent in attendance of an orientation class in Sacramento. An additional two days were spent sampling intertidal organisms at San Elijo and San Dieguito.

Identification and enumeration of organisms from Sunset Bay continued through the remainder of the month.

C. Central California Marine Sportfish Survey (DJ F25R2)

Partyboat and skiff port sampling continued at Monterey. One week was spent on the reef ecology study on Hopkins Reef. Very turbid water precluded fish transect counts on two days.

The Ophiodon was returned to the boat builder at Morro Bay for removal and replacement of the engine and drive unit. The OMC Company has agreed to replace the entire unit on warranty. Three tagged fish were returned, two copper rockfish and one brown rockfish. One copper rockfish moved about 3 miles in about a year's time.

Most of the month was spent collecting and analyzing lingcod life history data.

Miller and Kier attended a meeting regarding predation of sea lions on ocean sportfish at Moss Landing Marine Laboratories on March 11. Miller attended a second meeting on March 25.

The Dolphin was taken from Terminal Island to Monterey to be used while the Ophiodon is being repaired.

11. FOOD HABITS STUDY (Bartlett M67R)

Stomachs from 118 fish were collected during the month. We were fortunate in obtaining 31 kelp bass and 7 sand bass from a spearfishing contest at Laguna Beach. The 80 other stomachs were bonito from the local purse seine fleet.

Analysis of 167 stomachs was completed, including 50 albacore, 40 bonito, 39 bluefin tuna, 31 kelp bass, and 7 sand bass. The kelp and sand bass contained a variety of rocky reef-associated fishes, crabs and shrimp. The bonito examined which were taken in the summer time contained sauries and anchovies.

Almost all the project leader's effort in March was spent on budgeting, meetings, and special requests for information.

12. SPECIAL PROJECTS

A. Southern California

The first two weeks of the month were spent preparing the 1970-71 Program Budget for Marine Resources Operations.

Work continued during the month on bay and estuary planning. The marine section of the plan for Anaheim Bay was forwarded to Region 5. Species lists for Mission Bay and the Los Angeles-Long Beach Harbor

were completed and sent to the Bureau of Sport Fisheries and Wildlife to be incorporated into the Federal Water Pollution Control Administration's Estuarine Pollution Study. Work continues on the fish and wildlife plan for Upper Newport Bay.

B. Northern California

Most of the month was spent on preparing wildlife plans for Bolinas Bay and Elkhorn Slough. A display of oysters was prepared for an oyster festival held at Morro Bay March 15. French, Portuguese, eastern, native, and Pacific oysters were shown in growing trays on the oyster bed. About 5,000 people attended the festival and many of them visited the oyster beds. Over 3,000 bowls of free oyster stew were served to the public by promoters of oysters.

13. BIOSTATISTICS

A. Data Processing

Regular Reports: The February processors reports, cannery runs, and marine sportcatch reports were tabulated and distributed.

The February tuna and sportfish letters were completed and mailed.

November and December statistical reports were decoded and distributed.

The February striped bass logs were mailed to Inland Fisheries for editing.

Special Reports: A table was prepared for Tai Cho of UCLA showing cannery production for the Los Angeles area for 1961, 1964 and 1967.

Sturgeon tag release data for 1968 were tabulated and sent to the Striped Bass Investigation in Stockton.

A table was prepared for the Marine Resources Branch showing names and addresses of shrimp fishermen in Area A for the use of the Attorney General.

Tables were prepared for Roedel giving the catch in Mexico, by California fishermen, of market fish, albacore and bluefin for the last five years. These data were used in discussions with Mexican authorities on the U.S.-Mexican Treaty.

Tables were prepared for the International Pacific Fisheries Commission showing herring landings by month and area for 1968.

A table was prepared for Warden Russ Goodrich of Morro Bay showing abalone landings for 1968.

A table of landings of selected species for 1968 was prepared for the California Almanac.

Rick Akers of Security Pacific National Bank of Los Angeles was provided with a table showing landings and shipments of selected species in the San Diego area for 1968.

Harold Bissell was supplied with the 1968 annual kelp report.

Reports of 1950 lobster landings by port and origin were prepared for Dr. David A. Farris of U.C., San Diego.

The 1968 Circular tables showing case pack and processing of commercial and sportfish were completed.

Two follow-up mailings were made on the postcard survey.

Cold water reservoir, salmon, and market sample data were keypunched.

Work in Progress: Work is continuing on the following: January market receipts, March cannery receipts, March sportcatch logs, annual marine sportcatch reports, and the 1968 circular.

Field: Jim Bybee received a promotion to Assistant Fisheries Biologist and transferred to the Striped Bass Investigation in Stockton.

B. Technical Assistance and Mathematical Analysis

Statistical and Mathematical Analysis: Gotshall met with Abramson to discuss shrimp population dynamics.

Spawner-recruit and production models were fitted to revised Pacific mackerel data.

The second stage of the 1968 angling effort survey, consisting of 2929 cards, was mailed on March 7. By March 27, a total of 2763 returns from both stages have been received, 2605 of which are informative responses. The third stage mailing was scheduled for March 28.

Computers: The catch estimation program was rewritten for the 1966-67 Monterey anchovy sampling data; testing is in progress. Production runs of three preliminary programs were completed successfully.

An attempt to fit Newport Bay sand bass tag data to the Bertalanffy growth curve proved unsuccessful. The fitting will be repeated when more long term recoveries are available.

Revision of the program producing estimates of 1968 angling effort from postcard survey returns was begun. Additional categories of partyboat angler days and proportion of anglers fishing on partyboats will be included.

The commercial card-to-tape program was revised to change the tape format slightly.

October and November 1968 data were recorded on tape and verified.

14. VESSELS

ALASKA

Secured the entire month for main and auxiliary engines overhaul.

N. B. SCOFIELD

Vessel returned to San Pedro on the 1st from a forty-five (45) day Bottomfish Study of northern California coast.

On the 26th the vessel sailed for a three week Prawn Study off the southern California and Channel Islands.

Days scheduled 10; Days operated 7.

Vessel returned to port due to continuous bad weather off northern California.

NAUTILUS

Vessel conducted two 7 day oceanographic cruises off San Francisco.

Days scheduled 11; Days operated 14.

Bad weather delayed completion of work.

MOLLUSK

Worked four days on abalone project off Morro Bay.

15. MISCELLANEOUS

A. Meetings, Talks and Visitors

- | | |
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| Feb. 28 | - Aplin spoke to a sociology class at San Carlos High School on "Work of a Professional Conservationist". |
| Mar. 1 | - Ebert presented lecture on underwater survey techniques to graduate students at Moss Landing Marine Laboratories. |
| Mar. 4 | - A tour of the research and production facilities of Calimar Inc., San Diego, indicated their application for a fish breeders license was appropriate. |
| Mar. 5&6 | - Strachan and Duffy met with Ralph Horne, Horne Craft, to discuss boat specifications of our new 26 foot boat: Morro Bay. |
| Mar. 6 | - Turner, Ebert, Thomas, McGuire, Horne and Berry attended a diving safety board meeting at Santa Barbara. |
| Mar. 6 | - A progress report on the Newport Bay sand bass tagging project was given to 40 members of the Newport Sea Horse Spin Fishing Club at a night meeting. |
| Mar. 7 | - Gotshall attended Fish and Game Commission meeting at Crescent City. |
| Mar. 7 | - Meeting with Paul Hubbel, D-J Coordinator, to discuss project statements: Turner; Terminal Island. |

- Mar. 7-8 - Gotshall and Smith attended a symposium on New Product Development and Marketing in West Coast Fisheries, Eureka.
- Mar. 10 - Aplin spoke to the second year biology class at Menlo Atherton High School on "Biological Aspects of Oceanography".
- Mar. 11 - Orcutt, Bissell, Ebert, Lollock attended a meeting with P.G.&E. in San Francisco to discuss Diablo Canyon Nuclear plant design.
- Mar. 12 - Roedel attended an ICOR meeting in Sacramento.
- Mar. 12 - Strachan met with Stephens U. Smith, Dept. of Oceanography, University of Hawaii to discuss the production of calcareous sediment by benthic shallow shelf organisms of southern Calif.: Terminal Island.
- Mar. 13 - Mr. D. Rogoway, planner for San Luis Obispo County, met with Aplin in San Luis Obispo to discuss the future of Morro Bay.
- Mar. 14 - Meeting with Dr. Michael Neushul, U.C.S.B., to discuss proposed and on-going studies relating to the recent Santa Barbara oil spill: Turner and Strachan; Santa Barbara.
- Mar. 14 - Duffy & Hardy met with Leonard Burtman, San Diego RWQCB, at Del Mar to discuss sampling locations for the San Dieguito contract study.
- Mar. 17 - Roedel & Kaneen attended a meeting of the U.S. Advisory Section of IATTC, San Diego.
- Mar. 18 - Smith conducted a meeting of the Fishery and Marine Resources Technology Advisory Committee College of the Redwoods.
- Mar. 18-22 - Roedel & Kaneen attended the annual IATTC meeting, San Diego.
- Mar. 20 - Messrs. Hartranft, Patterson, and Dodd of Lockheed Corp. met with Smith to discuss marine resource potentials to Humboldt County.
- Mar. 20 - Heimann attended the Staff and Regional Managers meetings in Sacramento.
- Mar. 20 - Strachan and Bob Terwilleger, Marine Patrol, met with Clarence Hauschild, Peter Kiewitt and son, and Kenneth Sampson, Newport Harbor District Director to discuss C.F.&G. conducting a thorough biological study in a 70-acre section of the new Dana Point Harbor.
- Mar. 20 - Meeting with John Day (Region 5) and Ray Dunham and Charles Hazel (Water Projects Branch) to discuss water quality criteria for Los Angeles Harbor: Frey, Messersmith, Pinkas, Turner, Clemens; Terminal Island.

- Mar. 20 - Clemens attended the Wildlife Society meeting.
- Mar. 21 - Meeting with Roy Nakatani and Dave DesVoigne, Battelle Northwest (Washington) to discuss biological surveys relating to the Santa Barbara oil spill: Turner; Terminal Island.
- Mar. 21,22 - Several staff members attended the California Nevada section of the A.F.S. meeting at Davis.
- Mar. 23-24 - Roedel, Baxter, Abramson & Blunt attended the U.S.-Mexico fishery meeting, La Jolla.
- Mar. 24&25 - Strachan and Hardy attended Department orientation training: Sacramento.
- Mar. 24&25 - Messersmith, Wickwire and Crooke met with biologists from the Laboratoria de Biologia Marina, Ensenada, Baja California, Mexico under the direction of Manuel Flores to participate in cooperative anchovy tagging off Ensenada, Baja California.
- Mar. 24-25 - Jow attended PMFC Research Staff meeting, Portland.
- Mar. 25 - Frey met with Dan Odell, a graduate student at UCLA, to discuss his work with California sea lions.
- Mar. 25 - Clemens attended a budget session at TI.
- Mar. 26 - Frey attended meeting on proposed route of Santa Monica Freeway.
- Mar. 26 - Abramson and Berude attended a Control Data seminar on MACRAN, a series of programs performing time series analysis.
- Mar. 27&28 - Blunt and Hardwick met with U.S. Bureau of Commercial Fisheries Biologists at the Fishery-Oceanography Center in La Jolla for a joint scale reading session.

B. Personnel

- Mar. 1 - Steven N. Taylor, Assistant Marine Biologist, Shellfish Program, Eureka, transferred to MRB, Sacramento.
- Mar. 1 - John M. Duffy, Assistant Marine Biologist, Redondo Beach Harbor, transferred to DJ Environmental and Behavioral Studies, Terminal Island.
- Mar. 1 - Lutie W. Humphrey, Clerk Typist II, Region V, transferred to Administration, Terminal Island.
- Mar. 1 - May B. Trotter, Account Clerk II, Region V, transferred to Administration, Terminal Island.
- Mar. 1 - Ida K. Wade, Account Clerk II, Biostats, transferred to Key Punch Operator, Biostats, Terminal Island.

- Mar. 4 - Ferne F. Magar appointed permanent Clerk Typist II, Biostats, Terminal Island.
- Mar. 12 - Robert N. Lea, Assistant Marine Biologist, Pelagic Fish Investigations, Terminal Island, resigned.
- Mar. 17 - James R. Bybee, Junior Aquatic Biologist, Biostats, Terminal Island promoted to Assistant Marine Biologist, Sturgeon and Striped Bass Study, Stockton.
- Mar. 17 - Josephine Gonzalez appointed TAU Account Clerk II, Biostats, Terminal Island.
- Mar. 24 - Robert J. Meyers appointed TAU Tabulating Machine Operator, Biostats, Terminal Island.
- Mar. 24 - Peter A. Morgenroth appointed permanent Junior Aquatic Biologist, Tuna Investigations, Terminal Island.
- Mar. 24 - Rebekah A. Woods appointed permanent Clerk Typist II, Administration, Menlo Park.



Philip M. Roedel
Manager